

Physical and psychological response to physical rehabilitation in Coronavirus Disease-19 patient: A case report

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ABSTRACT

Corona virus disease-19 (COVID-19) has affected people of various age groups with symptoms ranging from asymptomatic mild, moderate to severe symptoms. Patients with mild symptoms require no medical intervention whereas moderate or severe symptoms require hospitalization and medical management. The following case report discusses the recovery of a COVID-19 patient with moderate symptoms. In a COVID dedicated tertiary care hospital in Ha'il region, Saudi Arabia. Physiotherapy has a great role as a part of a multidisciplinary team in the management of patients with respiratory and physical problems. The report mainly presents the impact of the physiotherapy role in the recovery of the patient and improving his physical and psychological status.

Keywords: Corona virus infection; Physiotherapy; physical function; Psychological response

1. INTRODUCTION

The COVID-19 pandemic was affected all age adults, especially those who had comorbidities (Promislow, 2020). The first case with COVID-19 was detected in Wuhan city, China, in December 2019. It was seemed to be highly infectious as it was transmitted from the infected person to others even when he was asymptomatic and thus has spread quickly all over the world. The virus is transmitted through respiratory secretions. Large droplets from coughing, sneezing, or a runny nose land on surfaces within two meters of the infected person (Van Doremalen et al., 2020). Multiple clinical complications were associated with COVID-19 infection such as respiratory, physical, vascular, and psychological complications (Abdelbasset, 2020; Abdelbasset et al., 2020; Simpson & Robinson, 2020; Ceravolo et al., 2020).



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COVID-19 patient can present with flu-like symptoms and respiratory infection which include fever (89%), cough (68%), fatigue (38%), sputum (34%), and/or shortness of breath (19%) (Guan et al., 2020). The disease severity ranges from mild upper respiratory tract infection, to severe viral pneumonia with respiratory failure and/or death (Sohrabi et al., 2020). The physiotherapy management guideline for COVID-19, Version 1.0, 23/3/2020 was recommended the role of the physiotherapist in COVID19 cases, which included a variety of rehabilitation task such as cardiopulmonary, musculoskeletal, and neurological in the form of passive, active assisted, active, or resisted exercises, mobilization and rehabilitation (e.g. bed mobility, sitting out of bed, sitting balance, sit to stand, walking, limb ergometry, exercise programs) to maintain or improve joint integrity, range of motion, muscle strength and functional capacity (Thomas et al., 2020).

2. CASE DESCRIPTION

The patient was a 39-year-old. In terms of past medical history, he had known hypertension from 2 years ago on Ca channel blocker (5 mg Amlodipine daily). On August 17, 2020, he began presenting sinusitis, low-grade fever 37.9°C, and dry cough. During the first week, he was not hospitalized and just received medication for sinusitis, which was prescribed by a medical practitioner. The patient took Azithromycin 500 mg once per day for 3 days, Fexofenadine hydrochloride once per day, and Paracetamol 500 mg 2 times per day. After 5 days of the symptoms were worsening to fever and dyspnea and nonproductive cough at rest, palpitations, and fatigue, his PCR test for COVID-19 came out positive on 25th august 2020 after which he was hospitalized in COVID dedicated Tertiary Care Hospital in Ha'il. At the time of admission, his SPO₂ was 91% on room air which improved to 96% on giving O₂ (4L/min). On general examination, he was a febrile, with a pulse rate of 120/min and blood pressure 135/85 mm Hg. On auscultation, air entry was bilaterally equal with no foreign sounds, CT scan was showed multiple patchy ground-glass opacities scattered in both lungs at the sub pleural regions. Investigations performed are mentioned in (Table 1).

During the hospitalization period, the patient received Paracetamol 1000 mg infusion 2 times per day for 6 days + Lopinavir-Ritonavir (200 mg and 50 mg, respectively, oral capsules 2 times daily for 6 days) + Ceftriaxone 1 gm once per day for 3 days + Montelukast 10 mg once per day for 2 months + Prednisolone 5 mg 3 times per day then withdrawal started after one month (when symptoms disappeared)+ Herbal syrup for cough (Triopan), 2 times per day for 10 days till cough relieved + multivitamins once per day, also he received oxygen therapy with anebulizer (4L/min) as he needed (when he feel dyspnea). The patient was discharged on the day six (august 31-2020) after the most of symptoms were resolved. After discharge, physiotherapy was started for him in an isolated room at his home with telephone instruction (tele-rehabilitation), also made a video meeting with him for more discussion about the exercise program that he should follow. The main chief complaints were cough, shortness of breath, and inability to perform activities of daily living such as bathing. The patient underwent a pulmonary (Modified Borg Scale (MBS) assessment. The physical function assessment was performed by 6 minutes walk test (6MWT). The quality of life assessment was done using the SF-36 questionnaire. The psychological assessment was done using the Hamilton anxiety and depression rating scale (HAM-D & HAM-A).

Physiotherapy rehabilitation program started at isolated room at home for four weeks, gradual exercise sessions were conducted by the patient independently. Exercises were assessed and followed up by tele-rehabilitation using a smartphone. It included 2 daily training sessions (30 to 45 minutes) showed in (Table 2), the first-week exercises were consisted of self inter-costal muscle stretching (5 minutes 2 times a day), chest wall vibration using a mechanical vibrator (every 2-4 hours for 5 minutes), forced expiratory technique 5 separated cycle with enough rest in between, walking short distance as much as the patient can and proper positioning especially prone positioning for 10 minutes which indicated for COVID 19 patients according to the international guidelines (Thomas et al., 2020; ANZICS, 2020). Exercises for the second week of rehabilitation were contained as self diaphragmatic breathing (5 cycles each session), pursed-lip breathing (5 cycles each session), self segmental breathing (5 cycles each session without resistance), vibration, and whole-body active exercise training (20 repetitions for each joint) such as bridging and range of motion. In the third week, the patient was encouraged to continue the previous exercises as much as he could and walk every day in self-paced speed and distances, and the walking distance was increased daily as much as he can. In the fourth week of rehabilitation, vital signs were stable and the patient did not have any limiting issues for her daily activities, but he said his activity level was lower than before the disease, so the focus of rehabilitation was to achieve the level of independence before the onset of symptoms, the evaluation of the patient was done every week by the previous assessment methods each week separately which included (Modified Borg Scale (MBS), 6MWT, SF-36 questionnaire, HAM-D, and HAM-A) as displayed in Table 3 and Figure 1.

Table 1 Investigations

Investigations	Values/Findings	Interpretation
Hemoglobin	13gm/dL	Borderline normal
Neutrophils	71%	increased
Lymphocytes	25%	increased
Ferritin	257 ng/mL	Normal
SGOT/AST	36.1 U/L	Borderline high
SGPT /ALT	42.7 U/L	Normal
Alkaline phosphates	150 U/L	Normal
BUN (UREA)	24 mg/dl	Normal
Serum creatinine	0.78 mg/dl	Normal
D-Dimer (25/08/2020)	1.02 mg/L	increased
D-Dimer (12/09/2020)	0.21 mg/L	normal
PCR(25/08/2020)	Positive	COVID positive
PCR(20/09/2020)	Negative	COVID Negative

Table 2 Physiotherapy management

	1 st week	2 nd week	3 rd week	4 th week
Prone Positioning	yes	yes	yes	yes
Inter-costal muscle stretching	yes	-	yes	yes
Forced expiratory technique	yes	yes	yes	yes
Chest wall vibration	yes	yes	yes	yes
Walking short distance	yes	yes	yes	yes
Prone positioning	yes	yes	yes	yes
Diaphragmatic breathing	-	yes	yes	yes
Pursed-lip breathing	-	yes	yes	yes
Segmental breathing	-	yes	yes	yes
Whole-body active exercise training	-	yes	yes	yes
Walking long distance	-	-	yes	yes

Table 3 Physiotherapy evaluation

	1 st week	2 nd week	3 rd week	4 th week
Modified Borg Scale (MBS) 0-10	9	7	6	4
6MWT (6 minutes walk test).meter	114	135	228	264
Short-form quality of life SF-36 questionnaire				
Physical functioning (PF)	30	45	61	73
Role functioning/physical (RP)	34	49	58	67
Bodily pain (BP)	26	35	49	57
General health (GH)	39	46	65	77
Vitality (VT)	42	53	59	82
Social functioning (SF)	21	28	47	52
Role functioning/emotional (RE)	20	26	39	41
Mental health (MH)	38	57	60	72
Hamilton rating scale				
Hamilton depression rating scale, HAM-D	19	17	16	12
Hamilton anxiety rating scale, HAM-A	20	19	15	11

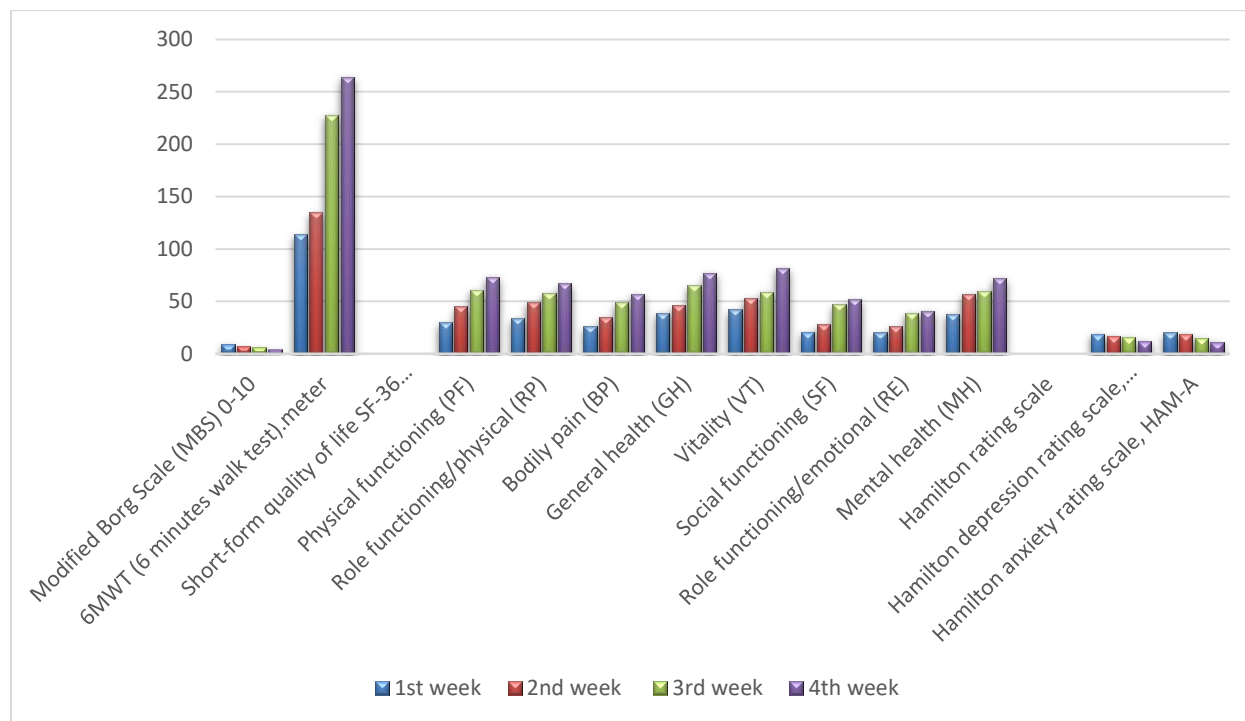


Figure 1 Physiotherapy evaluation.

3. DISCUSSION

The patient went through a total of 56 physical training sessions in 4 weeks. A complete evaluation was done pre and post-program. The results are presented in Table 3. Little articles are applied to address the effect of physiotherapy for COVID-19 patients. Although there are guidelines in the physical therapy management of patients with COVID-19 (Thomas et al., 2020). The main goals of physiotherapy management at post-infection recovery stage are to decrease prolonged bedridden complications, improve oxygenation, improve functional independence and improve psychological and social health. Physiotherapy management may include therapeutic positioning, ROM exercises, progressive ambulation, and breathing exercises (Jiandani et al., 2020).

The Health profession's awareness of the potential effects of COVID-19 disease has an important a critical role in selecting effective physiotherapy intervention for patients with COVID-19. Physical therapy exercise along with cardiopulmonary rehabilitation can improve life quality, psychological and social health for COVID-19 patients (Burađ et al., 2012; Giacino et al., 2013), respiratory physiotherapy can improve dyspnea and shortness of breath, and leads to the opening of collapsed alveoli, which prevents decreased lung function and atelectasis, resulting in improved perfusion-to-ventilation ratios (Abodonya et al., 2021; Moawd et al., 2020; Hanada et al., 2020; Ramsok et al., 2017). In addition to respiratory and physical complain, sometimes a feeling of depression and being neglected may be induced in COVID-19 patients in isolation. Exercise therapy is a way to overcome stress and anxiety and make patients to return to normal life. Maintaining physical fitness and independence in isolation situations is essential for mental and physical health for COVID-19 patients (Haines & Berney, 2020).

Physiotherapy intervention along with medical management helped to decrease the complications of bed rest and muscle weakness. The physiotherapy management in parallel with medical management, nutritional care, and counseling of the patient ensured excellent recovery (Paul et al., 2020).

4. CONCLUSION

This case report provides evidence for the development of a physiotherapy rehabilitation program for COVID-19 patients. We hope this clinical case report may be helpful for the rehabilitation of these patients. As shown in this study, COVID-19 cases benefit from physiotherapy, which improves the symptoms of disease in different ways.

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Author's contributions

AAI, HMM, HAH, SMA, GN, and WKA have conceptualized the study. AAI, HMM, and WKA have supervised the study procedures. AAI, HMM, HAH, and WKA have performed, collected the data of the study. AAI, GN, and WKA have analyzed data. AAI, HMM, HAH, and SMA have written the manuscript. AAI, GN, and WKA have reviewed the manuscript. All authors have agreed to submit the final form of the manuscript.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Consent form

A written & oral informed consent was obtained from the patient before starting the study.

Data and materials availability

All data associated with this study are present in the paper.

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